

these, and any other casual omissions, will ultimately be dealt with in an appendix.

The next family to be monographed, if the author continues to follow the arrangement prefixed to his first volume, will be the extensive family of Noctuidæ, which alone may be expected to occupy several volumes.

To the technical portion of the book we can scarcely refer here in detail. It is a work that appeals mainly to specialists, and only specialists will be able to appreciate the time and labour involved in its production at their full value.

Psychology Normal and Morbid. By C. A. Mercier, M.B. Pp. xvi + 578. (London: Swan Sonnenschein and Co., Ltd., 1901.) Price 15s.

MR. MERCIER'S "morbid" psychology is, as one would naturally expect, the best part of his book, and almost as good is the general discussion of the questions raised by pleasure-pain and by emotion. The author dissents from Prof. James's "back-wave" theory of emotion on much the same grounds which have led to its rejection by Stout and other contemporary psychologists, and, like Stout, rightly insists that the dependence of emotion upon an object beneficial or injurious to the organism must be the starting-point of any theory of its nature. An interesting feature of the discussion of pleasure-pain is the writer's belief that there are no reproduced ideas of pleasure and pain. The present reviewer is inclined to agree with him, but the question is a difficult one. In his general theorising Mr. Mercier is far too ready to accept associationist views which are virtually dead in the scientific psychology of to-day. This is specially true of his account of perception, which is identical with Spencer's, but quite at variance with the doctrine (which pathological cases as well as the study of animals seem to demand) that "ideas" are subsequent to precepts.

The weakest part of the book is the long section on logic, which is also, strictly speaking, irrelevant in a treatise on psychology. The axiom formulated on p. 86 would justify the inference, "Solomon is the son of David, and David the son of Jesse, therefore Solomon is the son of Jesse." The furious attack upon the mathematical doctrine of probability also rests largely upon the pure misconception that the statement of chances is put forward by mathematicians as a measure of the actual strength of our belief. A. E. T.

A Record of the Progress of the Zoological Society of London during the Nineteenth Century. Edited by the Secretary. Pp. 248. (London: Clowes and Sons, Ltd., 1901.)

UNDER the auspices of a committee consisting of Mr. Slater, Dr. Smith Woodward, Prof. Howes and Mr. Beddard, Mr. Scherren has prepared an excellent account of the principal doings of the Zoological Society since its foundation in 1826. The statements made are partly financial and partly relate to the number of the public who have availed themselves of the opportunity of entering the gardens, as well as to the papers read before the Society and to the lectures delivered in the gardens. It is curious to note the gradual growth of the popularity of the Zoological Gardens as a place of resort, a growth which is not altogether *pari passu* with the increasing population of the country. Thus from 1872 to the present day the number of visitors has always exceeded 600,000, and in two notable years, viz. 1876, when His Majesty the King, then Prince of Wales, deposited the animals brought back by him from India, and again in 1882, the year of the "Jumbo-mania," exceeded the usual maximum by a hundred or two hundred thousand. From 1864 to 1871 the numbers were 500,000 and upward, while in earlier years the average number was not more than 300,000 to 400,000, with the exception of the phenomenal years 1851 and 1863, when the admissions rose

to more than 600,000. The earliest year in which these numbers are recorded is 1829, when only 98,605 persons visited the gardens. The numbers then rose and again fell during the 'forties. During these seventy-four years there have been eight presidents, seven secretaries and three vice-secretaries. The late Earl of Derby and the late Sir William Flower held their office of president for the longest period, viz. twenty years, and next in order of tenure come the Prince Consort and the Marquess of Tweeddale, who occupied the chair for ten years each. This volume contains also a list of the present Fellows of the Society and the charter and bye-laws.

Leitfaden der Landschafts-Photographie. By Fritz Loeschner. Pp. v + 162. (Berlin: Gustav Schmidt, 1901.) Price Mk. 4'50.

WITH so many books in the English language on the subject of landscape photography, the amateur or professional may not think it worth while to read any new German work on the subject. This, however, should not be the case, for from such a volume as the one under notice it is possible, not only to obtain useful hints familiar on the Continent and unknown here, but at the same time to acquire facility in reading a foreign language.

The reader will certainly not be disappointed when he spends a few hours in becoming acquainted with what Herr Loeschner has to say in these 162 pages, for although the author goes, for the main part, over familiar ground, yet here and there a subject or object is seen from a new point of view.

The book is logically divided into three parts, namely, before the exposure, the exposure and after the exposure. The first deals with the apparatus generally employed in tripod and hand-camera photography, touching on the use and determination of the speed of shutters, perspective as produced by the objective, various kinds of and uses for photographic plates, and useful hints as regards packing, &c., for those who make long tours with cameras.

The second portion is restricted to the choice of the subject and the best way to photograph it, the author here giving some valuable suggestions on the consideration of distance, foreground, trees, sky, illumination and minor accessories to the picture. In the third and last portion of the book the treatment and after treatment of the exposed plate are described, the latter including all such manipulations as intensifying, retouching, copying, mounting, framing, enlarging and lantern-slide making.

Accompanying the text are twenty-four autotype reproductions from the author's own negatives.

Inductive Sociology. By F. H. Giddings, Ph.D., LL.D., Professor in Columbia University, New York. Pp. xviii + 302. (London: Macmillan and Co., Ltd., 1901.) Price 8s. 6d. net.

THE object of this book, in the words of the author, is "to present a scheme of inductive method, a somewhat detailed analysis and classification of social facts, and a tentative formulation of the more obvious laws of social activity." It is not in any way a mere discussion of the possibilities of census taking, but an attempt to formulate a general scheme for the statistical, or quasi-statistical, description of a nation or "society," using materials from every available source. Thus the description covers the features of the area inhabited, the nature and sources of the food supply, the density, multiplication, migration, &c., of the population, and its racial composition; the political activity, cooperation for social ends, and general organisation of the society; its social security and administration of justice; wealth and its distribution; education; vitality and morality. The work is prefaced by four introductory chapters on the study of sociology and the inductive methods to be used.

It is gratifying to find a writer on sociology acquainted with modern mathematical methods of statistics, and one who clearly recognises the value of such methods, but the definitions given in Chapter iii. of the introduction require some rewording. The word "number" on p. 21 is apparently used in the sense of "magnitude of the variable" instead of in the more natural sense of "frequency," but even in this sense it would not be correct to define the median as "the number midway between the lowest and highest"; it is correctly defined by the statement that magnitudes greater and less than the median occur with equal frequency, so that the median will not in general coincide with the middle of the observed range. Again, it is hardly correct to speak of a measure of variation as the "mode of the deviation"; mode is used in the sense of "most frequent value," and the most frequent deviations in the case of symmetrical distributions will be those approximating to zero. The term "standard deviation" was defined by Prof. Pearson, its introducer, in the sense of root-mean-square deviation, and it is apt to lead to misunderstanding if used in a vague sense, as in the text. The section on the "law of sympathy," pp. 108-110, would also be the better for, at least, some additional explanation; it is from its curtness almost incomprehensible as it stands, and some of the symbols used appear to be only defined in the appendix.

The book is suggestive of many possible lines of research by means of indirect statistical index-numbers, but we cannot help feeling that the author has tried to cover ground too wide for a single volume. The work as it stands is so abstract that it is almost impossible to estimate the practical value of the author's ideas, and such abstractness alienates the sympathy of the statistician. A much more liberal discussion of examples in the text would be both valuable and refreshing.

G. U. Y.

Optical Lanterns and Accessories. Edited by Paul N. Hasluck. Pp. 160. (London: Cassell and Co., Ltd., 1901.)

THIS handbook forms one of a series of practical manuals, and it brings together the more important and useful information in relation to the construction and management of optical lanterns. For the main part the editor has utilised material which has been published from time to time in the weekly journal *Work*, and has coordinated it in such a form that it will be found very serviceable to those who have much to do with lanterns. There are also chapters on the making of ordinary photographic, coloured and mechanical lantern slides, and some useful hints regarding the management of kinematographs. The book is well illustrated and should be found very handy.

Plane Geometrical Drawing, including numerous Exercises and Army Examination Papers, with Solutions. By R. C. Fawdry, M.A. Pp. xi+185. (London: E. and F. N. Spon, Ltd., 1901.) Price 6s. net.

THIS is a work of quite an elementary character, and very well suited to candidates for admission to Woolwich and Sandhurst. A good feature of the book is that it either gives a proof for each construction or refers to the particular proposition of Euclid on which the construction is founded. In addition to constructions relating to right lines, triangles, polygons and circles, there is a short chapter on the ellipse, which, in a second edition, might very well include a treatment of the parabola, inasmuch as the parabola is at once one of the simplest and the most useful of curves in the applications of mathematics. There are two good chapters on the use and construction of scales, and the book concludes with several specimens of papers set in the subject at the Woolwich and Sandhurst examinations, together with the solutions of the questions.

NO. 1680, VOL. 65]

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

The "Chestnuts" of the Horse.

THESE structures are well known and have been variously interpreted. But I believe that a suggestion as to their nature which I shall now put forward has not yet been made. Some months since I called attention in this Journal (vol. lxii. p. 523) to the general prevalence among mammals that use their fore limbs as grasping or climbing organs—in fact, in all other ways excepting as mere organs of progression—of a tuft of long hairs upon the wrist. I have since that time examined a large number of mammals, and find these vibrissæ in a considerable number of genera belonging to the orders Marsupialia, Rodentia, Carnivora, Lemuroidea (in which latter group the vibrissæ in question were first noted by Mr. Bland Sutton). They are absent from the Ungulata with the exception of hyrax, an admittedly ancient type of ungulate. Usually, but not always, a stout branch of the radial nerve of short extent ends in this patch of integument which bears the vibrissæ. The vibrissæ are quite similar to those found upon the head of the same mammals, for example the "whiskers" of the cat. The general occurrence of this carpal tactile (?) organ makes it, at least on *a priori* grounds, reasonable to suppose that traces might be met with in the ungulates, other than hyrax, where it unquestionably exists. There might not at first sight appear to be much in common between the callous pad, such as is the "chestnut" of the horses and asses, and this tuft of vibrissæ; but the conditions which I found to obtain in an armadillo (*Dasypus villosus*) suggested the comparison. In that animal the carpal tuft of vibrissæ is present; but instead of being a closely compacted tuft of about six hairs, as is usually the case, the hairs in the armadillo are not much larger than those of the skin generally, and are spread over a patch of integument of about half an inch in length and are more numerous. The patch of skin which bears them is thickened. If this were to proceed further the more strongly cornified epidermis would cease to bear vibrissæ, which would be, so to speak, driven into a corner beyond the specially thickened tract of skin. This stage, moreover, is not hypothetical; for in *Lemur catta* precisely this state of affairs exists, *i.e.*, a callous tract of skin close to which is a tuft of vibrissæ. If the latter were lost we should have the "chestnut" of the horse. The chestnuts on the fore feet, he it observed, occupy the right position, a little above the wrist.

FRANK E. BEDDARD.

Frost Patterns.

AS I was responsible for opening the discussion in these columns in 1892 and as I am able to confirm Dr. Catherine Raisin's observation as to the recent recurrence of the phenomenon on December 15, I am glad of the present opportunity of sending a few lines on the same subject in order to rectify an omission. In 1873 Prof. Joseph Henry, of the Smithsonian Institution, Washington, forwarded to Prof. Tyndall on behalf of Prof. Lockett, of the Louisiana State University, a beautiful photograph of "plumes produced by the crystallisation of water," the said pattern having been formed in the coloured sediment in the bottom of a basin in which the water had frozen during the night. This photograph is reproduced as a plate in Tyndall's "Lectures on Light" (I have only the second edition, 1875). It escaped my notice during the correspondence in 1892 or I should certainly have called attention to it.

R. MELDOLA.

Roads and National Welfare.

IN NATURE of December 19, 1901 (p. 149) is given a criticism of a work, in which some essential points in the making and maintenance of roads are strongly insisted on. At p. 156 of the same number there appears an excellent commentary on Mr. Balfour's speech to the students of the Goldsmiths' Institute at New Cross on December 12. With your comments I am in thorough sympathy, and would beg leave to point out that the two subjects are far more closely connected than might at first appear. Excellence and superiority